Math Virtual Learning

College Prep Algebra

May 11, 2020

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Lesson: May 11, 2020

Objective/Learning Target:
To determine which technique you will use
to solve Rational Equations

Let's get started!

On May 7, you created common denominators of each term of the Rational Equation so that you could use the numerators to solve the equation.

On May 8, you used the LCM of the Rational Equation to cancel the denominators of the Rational Equation to solve the equation.

Which Technique Is Better?

That is for you to decide today!

Practice:

- **Complete Which technique should I use? on the next pages.**
- **Be sure to complete the reflection question.**

To see worked out solutions and a sample reflection, scroll down.

		Solve by creating common denominators and using the tops only	Solve by multiplying each term by the least common multiple.
1)	$\dfrac{5x+20}{6x}+\dfrac{1}{x}=\dfrac{3}{2x}$		
2)	$\dfrac{1}{a-1}+4=\dfrac{2}{a-1}$		
3)	$\dfrac{4}{n+1}-\dfrac{1}{n^2+7n+6}=\dfrac{3}{n^2+7n+6}$		

4)	$\dfrac{x^2 - 5x + 4}{x^2 - 6x} = \dfrac{1}{x^2 - 6x} + \dfrac{1}{x}$		

5) Reflect on your work. Which technique do you prefer? Explain your choice.

1) $\dfrac{5x+20}{6x} + \dfrac{1}{x} = \dfrac{3}{2x}$

$6x = 6 \cdot x \qquad x = x \qquad 2x = 2 \cdot x$
$\quad = 2 \cdot 3 \cdot x$

$\underline{\text{Lcm}}$
$\quad 2 \cdot 3 \cdot x = 6x$

Common Deno

$\dfrac{5x+20}{6x} \cdot \dfrac{1}{1} + \dfrac{1}{x} \cdot \dfrac{6}{6} = \dfrac{3}{2x} \cdot \dfrac{3}{3}$

$\dfrac{5x+20}{6x} + \dfrac{6}{6x} = \dfrac{9}{6x}$

$5x + 20 + 6 = 9$

$5x + 26 = 9$

$\underline{\quad -26 \quad -26 \quad}$

$\dfrac{5x}{5} = \dfrac{-17}{5}$

$x = \dfrac{-17}{5}$

Checked in online calc. ⭐

Mult. each term

Lcm Lcm Lcm

$\dfrac{6x}{1} \cdot \dfrac{(5x+20)}{6x} + \dfrac{6x}{1} \cdot \dfrac{1}{x} = \dfrac{6x}{1} \cdot \dfrac{3}{2x}$

$1(5x+20) + 6 \cdot 1 = 3 \cdot 3$

$5x + 20 + 6 = 9$

$5x + 26 = 9$

$\underline{\quad -26 \quad -26 \quad}$

$\dfrac{5x}{5} = \dfrac{-17}{5}$

$x = \dfrac{-17}{5}$

⭐

2) $\dfrac{1}{(a-1)} + \dfrac{4}{1} = \dfrac{2}{a-1}$

$a-1 : (a-1)$

$1 : 1$

$a-1 : (a-1)$

$LCM = 1 \cdot (a-1)$
or $(a-1)$

Common Deno

$\dfrac{1}{(a-1)} \cdot \dfrac{1}{1} + \dfrac{4}{1} \cdot \dfrac{(a-1)}{(a-1)} = \dfrac{2}{(a-1)} \cdot \dfrac{1}{1}$

$\dfrac{1}{a-1} + \dfrac{4a-4}{a-1} = \dfrac{2}{a-1}$

$1 + 4a - 4 = 2$

$4a - 3 = 2$
$\quad +3 \quad\quad +3$

$\dfrac{4a}{4} = \dfrac{5}{4}$

$a = \dfrac{5}{4}$

Checked online Calc

☆

Mult w/ LCM

$\dfrac{(a-1)}{1} \cdot \dfrac{1}{(a-1)} + \dfrac{(a-1)}{1} \cdot \dfrac{4}{1} = \dfrac{(a-1)}{1} \cdot \dfrac{2}{(a-1)}$

$1 \cdot 1 + (a-1) \cdot 4 = 1 \cdot 2$

$1 + 4a - 4 = 2$

$4a - 3 = 2$
$\quad +3 \quad\quad +3$

$\dfrac{4a}{4} = \dfrac{5}{4}$

$a = \dfrac{5}{4}$

☆

3) $\dfrac{4}{n+1} - \dfrac{1}{n^2+7n+6} = \dfrac{3}{n^2+7n+6}$

$n+1 = (n+1)$

$n^2+7n+6 = (n+1)(n+6)$

LCM: $(n+1)(n+6)$

Common Dend

$\dfrac{4}{(n+1)} \cdot \dfrac{(n+6)}{(n+6)} - \dfrac{1}{(n+1)(n+6)} = \dfrac{3}{(n+1)(n+6)}$

$\dfrac{4n+24}{(n+1)(n+6)} + \dfrac{-1}{(n+1)(n+6)} = \dfrac{3}{(n+1)(n+6)}$

$4n+24-1 = 3$

$4n+23 = 3$

$-23-23$

$\dfrac{4n}{4} = \dfrac{-20}{4}$

$n = -5$

Checked in Calc ☆

Mult w/ LCM

$\dfrac{(n+1)(n+6)}{1} \cdot \dfrac{4}{(n+1)} - \dfrac{(n+1)(n+6)}{1} \cdot \dfrac{1}{(n+1)(n+6)} \quad \dfrac{(n+1)(n+6)}{1} \cdot \dfrac{3}{(n+1)(n+6)}$

$1 \cdot (n+6) \cdot 4 - 1 \cdot 1 \cdot 1 = 1 \cdot 1 \cdot 3$

$4n+24 -1 = 3$

$4n+23 = 3$

$-23 -23$

$\dfrac{4n}{4} = \dfrac{-20}{4}$

$n = 5$

$\longrightarrow$

4) $\dfrac{x^2-5x+4}{x^2-6x} = \dfrac{1}{x^2-6x} + \dfrac{1}{x}$

$x^2-6x = x(x-6)$

$x = x$

$LCm = x(x-6)$

$\dfrac{x^2-5x+4}{x(x-6)} \cdot \dfrac{1}{1} = \dfrac{1}{x(x-6)} \cdot \dfrac{1}{1} + \dfrac{1}{x} \cdot \dfrac{(x-6)}{(x-6)}$

$\dfrac{x^2-5x+4}{x(x-6)} = \dfrac{1}{x(x-6)} + \dfrac{1(x-6)}{x(x-6)}$

$x^2-5x+4 = 1 + x-6$

↖ Quadratic, solve by $=0$.

$x^2-5x+4 = x-5$

$ -x +5 \quad -x +5$

_____

$x^2-6x+9 = 0$

$(x-3)(x-3) = 0$

$x-3 = 0$ ↙ Same

$+3 +3$

_____

$\boxed{x=3}$

Check on Calc ⟵

☆

Mult by LCM

$\dfrac{x(x-6)}{1} \cdot \dfrac{x^2-5x+4}{x(x-6)} = \dfrac{x(x-6)}{1} \cdot \dfrac{1}{x(x-6)} + \dfrac{x(x-6)}{1} \cdot \dfrac{1}{x}$

$x^2-5x+4 = 1 + (x-6)\cdot 1$

$x^2-5x+4 = 1 + x-6$

$x^2-5x+4 = x-5$

$-x \quad +5 \quad -x \quad +5$

_____

$x^2-6x+9 = 0$

$(x-3)(x-3) = 0$

$x = 3$

5) I think I prefer creating common
denominators. It's what I learned when
I was little, so it's easier to keep
doing what I know with the algebra.
It might take extra steps, but I will
remember it better.